

THE AMENDMENTS

In the Specification:

Please amend the paragraph starting at page 6, line 28:

The present invention provides an optical information carrier comprising a solid material containing immobilized proteorhodopsin. The solid material can range in thickness from a thinly deposited layer orders of magnitude larger in two dimensions than in the third dimension to a thickly cast object with all dimensions of comparable magnitude. Immobilized, as used herein, means that proteorhodopsin is not mobile, and is fixed within the material. The interaction between proteorhodopsin and the material can be covalent or non-covalent. For example, proteorhodopsin can be physically entrapped within the material. ~~proteorhodopsin~~ Proteorhodopsin can also bind to the material by electrostatic charges, H-bond, hydrophobic, hydrophilic, or van der Waals interaction. By immobilization, the proteorhodopsin molecules are fixed and do not diffuse or diffuse very slowly within the solid material, such that an optical signal is not lost by diffusion of the proteorhodopsin molecules.

Please amend the paragraph starting at page 7, line 4:

As an optical data storage material, it is desirable to immobilize membrane-free, detergent-solubilized proteorhodopsin to avoid light scattering. Detergent-solubilized proteorhodopsin is usually in the form of a monomer, and sometimes in the form of an oligomer (dimer, trimer, tetramer, pentamer, or hexamer). Different from ~~bacteriorhodopsin~~ bacteriorhodopsin, proteorhodopsin protein is stable in its monomeric or oligomeric state for at least one month at room temperature, or one year at 4°C. The term “stable” refers to that proteorhodopsin does not change its spectral property significantly (less than 30 nm in maximum absorption wavelength) and is able to produce a photocycle upon excitation by light that includes a transition from the basal state to M-state. As a comparison, heat-denatured PR has no absorption peak in the 480-530 nm range. Heat-denatured PR molecules do not generate a functional photocycle and have maxima absorption wavelengths between 340-440 nm, often 350-430 nm, and more often 360-420 nm.